A 21st Century Internet for All Americans

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Executive Summary

- The U.S. economy is in the midst of the greatest economic expansion in history. This boom has already created 1.2 million jobs and $301 billion in estimated Internet revenue. By 2002, the Internet is expected to save global businesses over $1 trillion, resulting in lower cost goods and services in all industries — from health care to shoes.

- Notables such as Alan Greenspan now credit the expanding high-tech sector for the good economic times. In no other peaceful era in American history has the U.S. economy had such a good combination of low inflation and much gross domestic product growth of more than 4 percent. The effect of the Internet has been so successful that many economists now believe that the U.S. economy can sustain this growth for years to come as long as the Internet is allowed to grow.

- While Internet growth is exploding, bandwidth constraints and a lack of access in certain regions are having significant impact on today s Internet businesses and the applications of tomorrow. Today, applications such as telemedicine are not being deployed as rapidly as the technology permits because of the lack of inexpensive bandwidth connectivity. E-tailers, Web-based retailers, will lose nearly half a billion dollars in the year 2000 because of speed limitations.

- In short, the full potential of the Internet has not yet been realized — and may not be fully realized. According to a study by the Economic Strategy Institute, a dramatic shift to broadband networks could add an additional $616 to $721 billion to the U.S. GDP by 2005. Additionally, the economy could add another 4.4 to 5.1 million new jobs.

- The problems are particularly acute for small and medium sized businesses as well as rural America. Numerous studies from the Department of Commerce, Milken Institute, and the Progressive Policy Institute have concluded the same thing: some areas of the country and certain segments of the population are ill-positioned to take advantage and succeed in the Internet economy.

- The problems of a lack of broadband access and transport facilities have been well documented. The problems are acute.

    - Not a single major provider of bandwidth access is investing in non-MSAs (metropolitan statistical areas). Based on figures from the Competitive Broadband Coalition, by year end, more than 53 million Americans in urban areas will have access to broadband technologies compared to less than 1 million in rural America. This means that urban Americans are 18 times more likely to be offered broadband services than rural Americans.

    - By the year 2002, the gap between rural and urban Americans will actually increase, according to Wall Street growth projections for various broadband technologies. In three years, for every 1 rural resident with high-speed access to the Internet, there will be 20 urban residents with the same.

- The Internet backbone, the connections running between cities across America, is perversely skewed toward large cities. The Internet superhighway simply bypasses most areas of the country. In fact, less than 10 percent of the high-speed, redundant connections touch rural America.

Regulation is currently a major hindrance to greater economic equity:

- The major regulatory barriers to investment in new technology for rural areas are the result of federal statutes and regulations that prohibit several large incumbent telephone common carriers from owning Internet facilities and providing services. Related barriers arise for these same companies as a result of rules that raise expected costs or risks, reduce growth opportunities or otherwise reduce the relative attractiveness of investment in rural areas.

- A very important regulatory barrier to investment in rural backbone facilities is Section 271 of the 1996 Telecommunications Act which prohibits Regional Bell Operating Companies (RBOCs) from providing interLATA data service. Without this restriction — which was never written with the Internet in mind — many more rural communities would be served and the congestion issues would be less pressing.

- The provision of local access is also heavily regulated. Regulated pricing, corporate structure and forced resale at unreasonable rates force local phone companies into a defensive posture. Without proper market forces at work, it is impossible for these companies to rollout services in an ideal manner.

Without such restrictions, RBOCs would have a greater incentive to invest in rural and local communities, their existing client-base:

- The RBOCs face different economics than other existing carriers — economics that make timely, ubiquitous backbone construction financially acceptable. There are two primary reasons why this is true. First, it costs significantly less for RBOCs to make the incremental investment to extend the backbone network to rural communities. Second, RBOCs have a unique strategic imperative for building these networks in rural communities.

- Serving their communities, RBOCs also have incentives to build high-speed backbone connections in urban areas to provide local broadband business. These customers increasingly demand end-to-end broadband connectivity — meaning that if the backbone is slow, the RBOCs cannot sell customers local high-speed access service.

Lobbying groups and other special interest groups who argue against revised regulations have not been able to provide adequate evidence to support their claims.

- The Internet represents the greatest growth engine in modern economic times. However, while all boats are rising, some are rising much faster than others. Congress should remove the regulations that are impeding the ability of cities and states to take full advantage of the Internet and help reduce this digital divide.

Introduction

The amazing transformation of the computer and communications industries is presenting unheralded and unforeseen opportunity and challenges for America. Like the printing press, the telephone, electricity and other innovations that palpably altered the course of history, a broadband Internet promises to redirect and accelerate economic development not only in the United States, but also around the world. These technologies are morphing industries, creating new economic sectors, and making obsolete other economic sectors; social activity and interaction is becoming both more personal and more impersonal; and crucial services such as education and medical services are becoming more personalized and available.

With all evolutions of this magnitude and the diverse, fundamental changes they engender, there are unanticipated challenges that must be addressed. Fundamental economic shifts have more often than not widened the gap between haves and have nots — sometimes with disastrous social and political consequences. For governments, the challenges are pervasive, ranging from privacy and child protection to taxation, industry-specific regulation, job training, health care regulation, and redefining national security.

History instructs the reader that the countries best able to adapt to the changes occurring in their society, environment, and economies are the ones who prosper the most. History also provides many examples of government delay and poor judgments in one economic area that have had substantial ripple effects into others.

This paper is an attempt to outline a set of policy steps that the United States government should take in order to ensure that the broadband Internet fulfills its potential and truly becomes a broadband Internet for all Americans. At the same time, this paper addresses the implications of maintaining the current telecommunications regulatory framework. This framework designed for a pre-Internet era is ill equipped to manage the broadband Internet and the convergence of high-speed communications with computing power.

The paper begins with a description of the potential benefits of the broadband Internet. It follows with an analysis of the current and future deployment of this infrastructure and its souring implications for regional economic and social opportunity. After identifying and defining the developing problem, the paper details how regulations are in fact exacerbating the disparities in infrastructure development and accessibility across America. In Chapter 4, this study identifies a potential regulatory solution and challenges the arguments made against this proposed reform. It focuses specifically on how to maintain and enhance competition in a more market-oriented regulatory environment. The paper concludes with some competing scenarios for the future broadband Internet.

The Economic and Social Importance of the Broadband Internet

Broadband technologies promise to have a staggering impact on the U.S. economy and society. As with any evolving technology and industry, the precise nature of the social and economic changes is unknown. When asked about the potential returns of a broadband revolution, Andy Grove, the co-founder and chairman of Intel, replied that predicting this is akin to asking Queen Isabella to forecast the return on investment of sending Columbus to the West. The impacts are too far-reaching and unknown to accurately forecast or capture. However, some of their earliest ripples are already evident in our economy and our social interactions.

While the Internet has been characterized as an information superhighway, it s more instructive to think of the Internet like a railroad network. A century ago, railroad networks began connecting major cities together, making a few, select stops along the way at other major cities. There were a limited number of places to get on the railroad network, and people in far off communities needed to use horse and buggies to get to the stations. The same basic structure exists on today s Internet. While nearly everyone can get on the Internet, the vast majority does so at slow speeds and many communities connect to the high-speed network via very slow lines.

Just as there were tremendous advantages to settling towns around train depots in the 1800s, proximity to cheap high-speed connections is crucial to economic vitality. One hundred years ago, residents in towns that were not served by train stations had to use horse and buggy across dirt roads to get to the train stations. This slow, inefficient, and arduous transit made these towns less competitive than towns served by train stations. The same is true today. Costs of Internet services increase, while their speed and variety decrease, the farther a town is from an Internet hub. Distant towns can get on the slower, narrowband Internet, but cannot acquire broadband connectivity at a reasonable price, if at all.

Broadband — The Cylinders of the Next Economic Growth Engine

Economists, including Federal Reserve Board Chairman Alan Greenspan, have begun to acknowledge that this technology has changed the fundamentals of how the American economy works. Computers and other high tech hardware alone did not make the difference. Networking these devices together, through a seamless, widely available technology called the Internet, has been the key. An impressive proliferation of new technologies is inducing major shifts in the underlying structure of the American economy. Thanks to technology, says Treasury Secretary Summers, "productivity growth appears to have accelerated in a way no one could have expected several years ago," making possible ever-faster growth without inflation.

Table 1: Statistics on the Broadband Evolution — The Evidence Mounts

Electronic commerce is expected to save businesses up to $1.25 trillion per year by 2002, up from just $17.6 billion in 1998, by eliminating costs in core business processes. Much of this reduction is only possible with broadband technologies.

Broadband connectivity could help U.S. businesses reduce inventories by $1 trillion — saving more than $120 billio per year.

Broadband networks are a crucial part of ebusiness — a market expected to generate $1.3 trillion in sales by the en of 2003. Companies not connected with high-speed links risk missing out of this opportunity.

Broadband networks and the networking applications they support have reduced costs at one large company by $550 million. These cost reductions — across every sector of the business — are attainable by small, medium, and lar businesses alike, and give companies an enormous competitive advantage in global markets.

IBM estimates that electronic billing systems will save banks, billers, and customers as much as $46 billion per year.

Broadband networks and the applications only they can support are allowing workers to move into higher-skill, high-value added work, increasing productivity and wages. At one company, the move to more value-added work has boosted average earnings $10,000 higher than in its peer companies.

The Internet is now recognized as the catalyst of the U.S. labor productivity gains now being experienced — the firs substantial gains in twenty years.

According to a University of Texas study, Internet-related companies generate $300 billion in revenues per year. Another study states that the Internet is directly responsible for 1.2 million jobs. According to a study by the Economic Strategy Institute, a dramatic shift to broadband networks could add $616 to $721 billion to the U.S. GDP baseline scenario by 2005. Additionally, the economy could add 4.4 to 5.1 million new jobs.

But can this virtuous cycle last? Summers' answer to this question is more equivocal: "I think the economy is healthy in the sense that a healthy person doesn't know what he'll die of. But that doesn't mean he'll be immortal. And we can't assume that current experience will last forever."

The reality is that many applications that businesses and individuals want to use today on the Internet especially those involving video, intensive graphics such as maps and schematics, and complex formulas and spread sheet systems cannot be efficiently sent over the Internet. The Internet's current infrastructure is simply too limited at all levels to make it possible for new applications involved in building e-commerce to be deployed. The Internet is nearly tapped out and this could well undermine the continued economic expansion we have enjoyed.

Key to U.S. Productivity and Competitiveness

The broadband Internet is fast becoming an essential infrastructure for business. Broadband ecommerce applications are providing enormous choice, value and benefit to users, and ebusiness is quickly becoming an essential tool for the manufacturing, service and agricultural sectors. Because the Internet has allowed for the widespread, affordable linking of computers and communications devices at all levels of society, it has made it possible for companies to save huge sums on warehouse space, increased the knowledge base of companies so they can better anticipate business needs, and greatly improved the ability of companies to understand their markets and change quickly to meet demand. Communities not served by Internet backbone hubs risk losing critical industries to connected cities, and their citizens risk missing out on the full educational and commercial benefits of the Internet.

For example, broadband connectivity could help U.S. businesses reduce inventories by $1 trillion, resulting in savings of more than $120 billion per year. These savings could be applied to new investment, worker training, and economic expansion. IBM estimates that electronic billing systems would save banks, billers, and customers as much as $46 billion per year, and current large users of broadband networks are already reporting unprecedented savings and competitive advantages. In all, according to a study by the Economic Strategy Institute, a dramatic shift to broadband networks could add $616 to $721 billion to the U.S. GDP and 4.4 to 5.5 million new jobs by 2005.

Equity on the Internet

> *The absence of bandwidth will be more isolating than the densest forest or largest desert.*
> *Nicolas Negroponte, on whether location still matters in an online world*

The longest economic boom in U.S. history has meant prosperity for most, but not for all. A slew of reports from a diverse set of institutions such as the Milken Institute, the iAdvance Coalition, the Progressive Policy Institute, the Center for National Policy, and the U.S. Department of Commerce all conclude the same thing: while many states have benefited from this economic boom, many others have not and many states are poorly positioned to take advantage of future changes in ecommerce.

Collectively, these studies suggest that many factors have contributed to the boom of the U.S. economy, and that both government and private sector initiatives are necessary to ensure a more equitable distribution of economic growth. More specifically, all of these reports imply to varying degrees that investment in broadband infrastructure is and will become increasingly crucial for sectoral development.

Helping Small Businesses Compete

Small to medium sized businesses constitute eighty percent of the U. S. business sector. Twenty percent of these firms are located in rural areas, far away from major metropolitan centers. Many of these businesses are suppliers to larger firms or rely increasingly on data systems to keep in touch with their customers, to locate business prospects or order supplies and equipment.

Despite the fact that sixty percent of all small businesses today already use the Internet in their business operations, "rapid Internet expansion and the development of high speed, fiber optic backbones ... has fueled a worldwide access gap, particularly in the U. S. and Europe."[1] Ironically, as broadband is deployed, many small businesses may be disadvantaged because they will neither have the access nor be close enough to broadband networks and connections in order to use them to compete. Larger firms and small businesses in close-in urban locations may get faster connections more rapidly. A "digital divide" between large and small businesses may develop.

Already, some smaller firms are feeling the pressure. Large car manufacturers, for example, are beginning to tell their distributors and dealers that all manuals, documentation, and other complex information supplied by the manufacturers will be supplied in the near future *only* over the Internet. Firms that are too far from major backbone Internet connections or do not have ready access to broadband connections may find themselves left out or unable to compete. As in the

[1] Hillery, Cynthia and Dalgliesh, Damian. *Telecommunications Online*, July, 1999.

days when railroads built tracks across the U. S., wherever a station was built, is was there that growth could occur. The same is true of broadband deployment.

Encouraging Continued Growth in New E-Commerce Applications

At a recent Economic Strategy Institute conference, Andy Grove of Intel said plainly, you can t have [the next generation of] ecommerce without deployment of an advanced telecom network. This blunt assertion has been echoed by pundits and businesspeople alike who understand that broadband represents an infrastructure for a new business model — and new opportunities.

Streaming video, 3-D graphics applications, new types of medical scans

"Broadband is going to be extremely helpful in making the shopping experience online even more

3. Internet services.

New applications are making it practical for direct communications between patient and provider and physician and specialist. In this way telemedicine can bring medical services directly to the point of need. It can empower consumers, giving them greater control of their own health and wellness by bringing healthcare to the patient rather than the patient to the provider. By providing direct links between the general practitioner and major medical centers it can also sustain the education of the physician.

All of these services, especially advanced home care, will require connecting broadband technologies to the home at affordable costs.

Improving the Service, Quality and Cost of Medical Service

Telemedicine has the potential to save more lives, improve treatment and save substantial medical costs. Research has shown that older patients who do not have to be moved long distances for treatment recover much more rapidly and fully than those who must be transported many miles to hospitals. In addition, the inability to use and share offsite medical resources, including the medical advice and opinions of other trusted and respected doctors, limits effective medical treatment.

Telemedical applications are in use in many parts of the U. S., especially in the U. S. prison system, where avoiding the transport of prisoners, especially dangerous ones, is an important objective. Yet, the lack of widely available broadband networks makes it extremely difficult to fully utilize the potential of telemedicine. For example, a standard x-ray can take up to four minutes for a doctor to download. In emergency situations, that amount of time can be critical to patient survival. In the same four minutes, using broadband technologies such as DSL, six or more x-rays from different angles can be downloaded, allowing the doctor to see more information, see it virtually real time and provide immediate advice to the hospital or doctor requesting the assistance.

Ensuring broadband deployment throughout the U. S., from the local loop to the backbone, will help improve medical treatment, save money and save lives.

Etailers – Slower Internet Means Slower Sales

At the time of the Discovery space shuttle lift-off in the U. S., the Internet was swamped with visitors attempting to watch it live on the CNN web site. Video streaming, which includes audio feeds, is an application in increasing demand on the Internet. It has not only commercial potential but applications in education and medicine as well. Yet, the majority of visitors who tried to connect to CNN to watch the launch failed. CNN technologists at the time suggested that overall web congestion might well have been instrumental in this failure.

Five hundred million people worldwide are expected to be using the Internet within just the next five years, very likely a conservative estimate. With web sites expected to carry more data, with people spending more time online, with more and more people trying to work from home, and with more bandwidth-consuming multimedia, the Internet's growth, and the growth of industries associated with it such as software development, could well suffer.

Already, there is evidence that the growth of e-commerce is being affected by the Internet s current capacity shortfalls. For example, a new study by Zona Research has found that web-page

download failures occur at an average rate of about 2.2% of the time and connection failure rates to the Internet average between 6.6% and 10.9% of the time: an astonishingly high figure.

Zona also found that consumers are avoiding online purchases, in a high number of cases, because of slow download speeds and connection failures. It calculates that up to $362 million per month, or perhaps as much as $4.35 billion in e-commerce sales in the U. S. may be lost each year due to unacceptable download times. This is sales to consumers by businesses, not business to business transactions.

Depending on how consumer online sales are calculated, this figure could be anywhere from one-quarter to one-half of the potential sales on the Internet. Clearly the Internet s quality and speed problems are already damaging the potential growth of e-commerce.

Conclusion

The potential of the next generation of broadband ebusiness and ecommerce is staggering. It promises to transform the Internet of today and provide its users with a vast array of opportunities. However, a number of studies from both private and public sector groups suggest that there is a large gap between communities that have the infrastructure to compete and those that do not. This gap has led to significant growth rates and job opportunities to date and could lead to even greater disparities moving forward. The next section takes a closer look at this problem.

Lack of Broadband Capacity: A Growing Problem

> The Internet is now reaching a critical point. Its constraints are felt by all parties that use or provide IP services. Consumers are feeling the bandwidth crunch on a daily basis. Businesses are still looking for ways to use the Internet not only as a marketing tool, but also as an efficient, cost-saving operations tool. Providers are running as hard as they can just to keep up with capacity demands and are searching for answers to these challenges. The question is will the Internet be a shiny new playing field for an explosion of communications miracles and prosperity among its users and providers? Or will it be an Internet burdened by yesterday's technology desperately searching for answers, that brings in the new millennium?[2]

The chief scientist at Cisco Systems, Van Jacobson, recently warned that increased popularity of streaming media threatened to create traffic jams across the Internet. The increased demand could lead to what Jacobson calls congestion collapse the Internet equivalent of gridlock.

All of the opportunities that the Internet has generated so far, and the robust potential that it can deliver, will be sustained only if the physical network continues to evolve at a brisk pace. Unfortunately, many experts believe that overly intrusive regulation is stifling investment from major sources of capital. As a result, rural America does not have, and will not have, the necessary physical infrastructure to participate fully in the Internet economy. The nervous system of the Internet, the backbone, connects major cities in the United States, passing by rural America and even mid-sized metropolises. Moreover, although a very high speed, reliable backbone exists for business customers along major routes, capacity constraints exist for smaller business and residential users.

As a result of the lack of backbone connecting rural America, rural American s access to the Internet is substantially inferior to that of the urban connectivity. Businesses in rural areas cannot be guaranteed the service quality needed to participate in some of the most promising business-to-business electronic commerce boom, and residents cannot get the throughput for reliable telemedicine, distance learning, telecommuting, and other advanced Internet applications.

The growing divide between rural and urban is evident in backbone hub deployment and in overall broadband access.

The Internet Highway — Rolling By, But Not Stopping

Backbone hubs are the gateways where Internet Service Providers (ISPs), corporations, and local telephone carriers connect to the Internet backbone, which carries Internet traffic around the world. It is helpful to think of Internet backbone hubs as train stops on a national railroad network. In the railroad system, travelers can only get on the train at the stations. Backbone hubs serve as today s Internet train stations, allowing people to climb aboard and participate in ecommerce and ebusiness and partake in the Internet revolution. Just like in the old West, there

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[2]Ovenden, Francis. *Telecommunications Online*, January, 1999.

are many states and towns where the Internet backbone rolls on by, but doesn t stop. Without an Internet backbone hub, there is no way to get on board the broadband Internet.

Having a nearby Internet hub serving a community provides a tremendous economic and social advantage. To further utilize the train analogy, one hundred years ago a town far away from a railroad stop was at a significant disadvantage as compared to a town right at the stop. The further town needed to construct expensive roads to get to the train depot, and often had more difficulty getting wares to market. Much the same can be said about today s Internet backbone hubs and their impact on communities. Communities that remain underserved will not be able to offer their business or household customers the broadband services available to the rest of the country at a comparable price — if at all.

When Internet backbone hubs are nearby, ISPs can directly connect to the facilities that carry the traffic around the country and around the world. These ISPs can offer their communities higher quality broadband service, lower costs, and, eventually, greater access to more broadband applications and services than communities far away from backbone hubs. Companies in rural areas without nearby Internet hub access will spend a significant amount more money to conduct crucial business functions, such as, supply chain management, inventory control, and the like. ISPs with direct local access to backbone hubs can also guarantee higher broadband speeds, allowing residential users to take greater advantage of ecommerce, education, and telemedicine applications.

Building an Internet hub is not cheap. The necessary facility space, technical staff, back-up power supplies, industrial A/C, and routing equipment can cost up to $200,000. The equipment costs for backbone circuits are roughly the same for serving a big city as a small city. Local loop circuits vary substantially between rural and urban locations. An urban ISP providing broadband services to its customers will typically spend between $3,000 and $5,000 per month on necessary local loop circuits to connect to an Internet hub. In most cases, a rural ISP which desires to supply the same level of broadband service cannot buy the same connections, but those who can are typically forced to cross a LATA boundary[y]. These rural ISPs spend between $41,000 and $45,000 per month[h].

Not only are costs higher in rural areas, but revenues are lower. While rural businesses such as agriculture have been among the most technology-savvy in the past, their sheer distance from one another means that a single hub can only garner revenue from a more limited pool of consumers. With these types of financial considerations and the lack of availability of high-speed lines, it is no wonder that rural broadband deployment is slower than urban buildout

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[3] An ISP in southeast West Virginia, for example, cannot purchase a DS3 from any of the interexchange carriers. Not buying this high-capacity circuit means that the ISP cannot offer the same fast, reliable service as their counterparts in urban areas. Moreover, the new carriers laying fiber across America are building this capacity between the same cities as current providers — meaning that new providers such as Qwest and Level 3 will not assist rural ISPs and communities who wish to offer and use broadband services.

[4] Source: MCI/Worldcom wholesale rates. Rural ISPs need to buy an originating and terminating local loop circuit ($3,000-5,000 each) and an IXC circuit to cross the LATA boundary. In order to provide guaranteed broadband service to customers, an ISP must purchase a DS3 circuits. The IXC wholesale ISP rate for DS3 circuits can range anywhere from $25,000 to $45,000 per month. For this calculation, MCI/Worldcom s rate for a Hagerstown to Washington DS3 circuit ($35,000 per month) is employed.

Charts 1 and 2 on the following pages depict the Internet topography and the role of Internet backbone hubs. The first chart shows and describes the efficiencies gained from being served by multiple Internet backbone hubs. It is important to note that being served by a single backbone hub is undesirable for businesses and may make Internet access more costly. Ideally for ecommerce and ebusiness, multiple backbone hubs would serve a community.

Chart 2 depicts the problems faced by rural ISP and their customers. In under-served areas, ISPs often reach the Internet backbone by daisy chaining (leased line A) to another ISP which has a leased line to an Internet hub. In many cases, these daisy chains stretch hundreds of miles. This process is much more expensive than having a direct connection to a local hub. The cost is added into a rural ISP s cost of doing business, and the risk of outage or delays increases because the ISP has just one, often lengthy path to an Internet hub. Towns and states not served by nearby backbone connections are required to spend significantly higher fees to get connected to the distant hub.

These expenses raise the cost of doing ebusiness, setting up a web site, or starting an Internet start-up in remote areas. This is why web companies and information providers such as Excite, AOL, eBay, Amazon.com, priceline.com, and VerticalNet avoid rural and under-served areas; they can get better prices and connections from ISPs close to Internet hubs.

As of spring 1999, there are 1,042 Internet backbone hubs across America.[5] However, these hubs are heavily concentrated in the largest metropolitan areas. 210 of the country s 346 metropolitan statistical areas (60.7 percent) do not have direct on-ramps to the Internet. Moreover, only 98 backbone hubs serve towns in non-metropolitan areas, and almost all of these serve universities. The chart below shows how extreme the digital divide is between cities across the United States.

City	Number of Hubs
Chicago	37
New York	37
Los Angeles	35
Washington	33
Atlanta	32
Cincinnati	6
Louisville	5
Omaha	3
Boise	2
Mobile	2
Greenville, SC	1
Little Rock	1
Bangor	0

In the continental United States, nine states have only one or no backbone hubs. By comparison, California has 177 — more than the bottom 31 states combined. Chart 3, in the appendix, shows

[5] This represents the total number of backbone hubs for the 50 states and the District of Columbia. There are 984 hubs in the 46 states studied in this paper.

the number of backbones per state for all states, and the chart below compares the top and bottom ten.

Top Ten States	No. Backbone Hubs
California	177
Texas	90
New York	58
Florida	58
Ohio	56
Illinois	44
Virginia	39
Missouri	38
Georgia	36
District of Columbia	34

There are more backbones in these states than in the rest of the country combined plus U.S. territories.

Bottom Ten States	No. Backbone Hubs
Delaware	2
Arkansas	1
Wyoming	1
Kansas	1
West Virginia	0
Montana	0
South Dakota	0
North Dakota	0
Maine	0
Vermont	0

In sum, there is a vast divide in the deployment of backbone hubs, one that threatens to seriously disadvantage rural areas. The vast majority of investment is falling into the major cities, and the states with richer population clusters. The combination of this hub paucity and other deployment shortfalls in rural areas has translated into a broadband digital divide, as described in the next section.

The Broadband Access Digital Divide

For years to come, small and medium sized enterprises, home businesses, and residences in rural America will not be able to seize the opportunities presented by the Internet and electronic commerce. Given the rapid pace of change, the specter of wider divisions between urban and rural, and between rich and poor is not just a possibility, but a coming reality.

To examine the extent of the gulf between rural and urban access, the iAdvance Coalition developed an estimate of the current state of access in America for one of the two major broadband delivery methods, DSL. Exact figures for cable modems, the other major delivery contender, are harder to come by. However, it is possible to show the amount of cable needed to fill the gap left by DSL, and then explain why it is unlikely that cable will even come close to bridging the digital divide. Accordingly, estimates for current and future gaps in the DSL market

are provided first, and then the implied deployment rates for cable (and other possible delivery technologies) are shown in the following section.

Today s Divide

The current numbers for DSL paint a powerful portrait of today s broadband digital divide. The proportion of rural Americans who will have broadband access this year under the best possible assumptions is a meager 1.4 percent. In comparison, the proportion of urban Americans with broadband access is 25.1 percent. (See Table 1) Under these conditions, urban American customers are receiving access at a rate eighteen times that of rural Americans. These figures represent an, optimistic estimate of current conditions.

Table 1: Best Case Estimate of the Current Broadband Digital Divide

	Rural	Urban
Population	53,734,424	212,719,576
Population with access	750,000	53,290,800
Percent with access	1.4	25.05
Differential		**18x**

The Future Divide

While no digital divide is ever acceptable, it is logical to expect those urban communities with higher population density and higher incomes to be served before lower density urban areas. The question for policymakers is not whether a divide exists today, but how long will it exist and can it be narrowed.

To understand the changes that must be made, it is essential to understand the future of the broadband market and the potential division of urban and rural services within it. As for the future of DSL, the Yankee Group projects that 137 million residential consumers will have access to DSL broadband service by 2002.[6] Combining that figure with the one derived above, and assuming growth remains even between 1999 and 2002, it is possible to extrapolate the intervening figures.[7] This calculation yields numbers for DSL availability between the years 1999 and 2002 of 53, 81, 109 and 137 million respectively.

The question then becomes how much will rural availability grow in the same period? For simplicity, one can assume it will increase at the same average rate as overall availability: 33% per year. This estimate is, of course, extremely optimistic, since all indications are that urban

[6] Cable Modems vs. DSL: Dispelling the Myths. The Yankee Group: Report Vol. 15, No. 21, November 1998, p.15. The number of households figure was multiplied by census information to give number of residents. While this number does not include business and is probably somewhat low, given that current market figures are already ahead of their projections (at least according to CBC citations), it is useful as a conservative lower bound.

[7] This assumption is supported by the implied growth in the Yankee Group s model. In their model, the universe of customers with access grows by a somewhat smaller percentage in 2000 than in 2001 and 2002, but is also fairly even.

growth will proceed much more quickly than rural growth, and that almost all investment over the coming years will be focused in urban areas. As the Yankee Group report noted:

> We believe that both cable operators and telcos will continue to focus deployments on their best markets, resulting in a nation of haves and have-nots for two-way high-speed Internet access.[8]

However, to err on the conservative side, we will adopt this assumption. Subtracting projected rural growth from projected overall growth, as derived above, gives projected urban growth. The summary of these projections is shown in Table 2.

Table 2: The Estimated Future Broadband Divide in DSL

	1999	2000	2001	2002
Rural Access	750,000	997,500	1,326,675	1,764,478
Urban Access	53,290,800	81,289,867	109,288,933	137,288,000
Rural Percent	1.40%	1.84%	2.42%	3.19%
Urban Percent	25.05%	37.84%	50.34%	62.63%
Greater Urban Access	**18x**	**21x**	**21x**	**20x**

Broadband Cable and Wireless: Knights in Shining Armor?

Clearly then, even under the most optimistic assumptions, the broadband digital divide in DSL will widen in the coming years, leaving rural America far behind. The only remaining question is, will any other technology fill the gap?

Analysts and forecasts unequivocally suggest that the answer is no. The numbers of consumers that cable broadband would need to reach in rural areas to equal the access in urban areas would be astronomically high, as demonstrated in Table 5. The figures show that cable companies would have to provide 23 percent of their new service to rural areas, implying that they would disproportionately invest in rural Americans (who make up only 20 percent of the population). To put it another way, cable companies would have to deploy between 13 and 22 times more than DSL providers in rural areas, implying that the economics of deployment for cable companies in rural areas is more than an entire order of magnitude better than it is for telcos. In short, given the widely acknowledged fact that cable companies have little more incentive to deploy in rural area than telcos currently do, the cable companies will not bridge the gap.

[8] Cable Modems Vs. DSL: Dispelling the Myths. P. 10.

Table 3: Cable Will Not Bridge the Broadband Digital Divide[9]

	1999	2000	2001	2002
Number of Rural Customers Needed to Bridge the Gap	12,711,622	19,536,878	26,280,459	32,915,413
Total Cable Availability	69,692,000	91,438,000	105,586,000	119,996,000
Percent of Cable Needed to be deployed in Rural Areas to Bridge the Digital Divide	**18.2%**	**21.4%**	**24.9%**	**27.4%**
Percent of DSL deployed to Rural Areas	1.4%	1.2%	1.2%	1.3%
Greater Cable (than DSL) in Rural Areas Needed to Bridge the Digital Divide	**13x**	**18x**	**21x**	**22x**

There are several wireless technologies that are best described as wild-cards in the broadband market. Fixed wireless applications operating at 2GHz have begun offering some services and are expected to begin raising the capital necessary to deploy their networks. However, no analyst report reviewed for this study was convinced that these technologies would serve more than niche markets between now and 2002. Satellite service providers, similarly, are planning to launch birds and initiate service over the next five years, focusing primarily on the business market. One report suggests that satellite services could blossom in the residential market beyond the current time window, but this remains untested. Perhaps the most promising fixed wireless technologies, 24GHz, 28GHz, and 38GHz services could have a significant impact on the residential and rural markets in the future. For the next five years, however, analysts believe that these providers will focus heavily on urban and business customers while slowly expanding to residential customers in multi-tenant buildings.

Thus, the broadband digital divide will be substantial. The DSL disparity, even under the most promising conditions, will be tremendous. Cable companies may perhaps be able to provide rural access in somewhat greater proportions than telcos, *but even with extremely high rural investment by cable companies, a major gap will still remain.* Either way, the broadband digital divide will be with us in the coming years.

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[9] Number of Rural Customers Needed to Bridge the Gap is calculated by applying the projected percent of urban consumers with DSL access to the overall rural population, and subtracting the projected number of rural consumers with DSL access. Total cable availability is taken from *I m Tired of Waiting,* P. 16 and converted from households to consumers (other services, such as satellite and wireless, are not included because they are projected to have marginal market presence in the next three years, again as seen in *I m Tired of Waiting,* P. 16). Percent of Cable Needed to be deployed in Rural Areas to Bridge the Gap is the ratio of Number of Rural Customers Needed to Bridge the Gap to Total Cable Availability. Percent of DSL deployed to Rural Areas is derived from Table 4 by dividing rural availability by the sum of rural and urban availability. Finally, Greater Cable (than DSL) in Rural Areas Needed to Bridge the Gap is the ratio of Percent of Cable Needed to be deployed in Rural Areas to Bridge the Gap to Percent of DSL deployed to Rural Areas.

Beyond 2002: Whither the Broadband Digital Divide?

While the future of the broadband digital divide beyond 2002 is difficult to determine with any degree of precision, it is likely to improve from its present condition. Analyst reports suggest that most major buildout in metropolitan areas will be completed by 2002, and that, in fact, there will be much slower growth in DSL access lines from that point forward. These two pieces of conventional wisdom combine to suggest that the broadband digital divide will ease somewhat, as companies begin to focus more on residential and rural deployment.

Yet, the future closing of the gap is difficult to predict, and anything short of a fundamental shift in technology will not alter the basic problem. If the gap were to close by 50 percent from 2002-2007, urban residents would be 10 times more likely to have access to the broadband systems of the future. Even a 90 percent closing would leave a troublesome broadband digital divide. Given the starting point, it appears that closing of the broadband digital divide has a long way to go.

Conclusions

In these good economic times, and with this tremendous promise on the horizon, it is all too easy to become complacent and overlook the potential for danger ahead. There is a dark side to the Internet explosion: while it has created opportunity, it has not created opportunity for all. While forty percent of American households have access to the world of ecommerce and the Internet, the majority do not, and less than 0.5 percent have the broadband access necessary to reap the full benefits that the Internet will deliver. Large businesses and the wealthy have these systems, while the rest of America waits for connections and webtone. The split runs more than just along economic lines, it is creating a geographical digital divide with rural and inner-city neighborhoods being left behind.

According to J.P. Morgan Securities *Telecoms in the Age of the Internet*, Right now, a significant local loop bottleneck exists, as fewer than one million households have broadband data connections. It continues, The residential and small and medium-sized business market is where the bottleneck is most obvious. The report signals a tepid view of the future: Our view is that this bottleneck will ease, but only gradually Experts agree that under current regulations the pace will be glacial indeed. Current trends projected indicate that universal broadband service is decades away.

In short, rural communities are about to be left out, again. As has occurred with too many technologies in the past, the Internet has created a nation of haves and have-nots in the last few years a digital divide, wherein the largest cities garner the greatest advantages. Now, as new, *broadband* Internet technologies are set to sweep across America, it appears that rural areas are once again being ignored. Moreover, this is not likely to change in the foreseeable future.

The lack of a broadband infrastructure will make it very difficult for rural communities to attract Internet and other high tech companies who rely on these systems as their corporate lifeline. A resident of Maine or Montana who envisions starting the next eBay, Amazon.com, or AOL will have to move to more wired cities/states in order to establish the business.

Existing rural enterprises will increasingly need to be connected to their suppliers and customers via broadband links. These connections bring substantial cost efficiencies that allow companies to offer better services at much lower costs. Without broadband access — or with more expensive

or less reliable access, a business will be at a significant competitive disadvantage vis-a-vis their competitors in a major, wired metropolis. These companies may have significant difficulty retaining their existing contracts with suppliers demanding cheap products.

Furthermore, the lack of bandwidth threatens to slow and possibly to end the economic prosperity that America has enjoyed recently. The U.S. Department of Commerce maintains that two full percentage points of economic growth are directly related to the digital economy. According to the *Wall Street Journal*, information technology stocks (Internet, ecommerce, computer and high-tech) now constitute 20 percent of the total stock value on U.S. markets — up from 10 percent just three years ago. The *Economist* and the *Financial Times* cite America s vibrant Internet, ecommerce, and high-tech sectors for our continued growth in light of the Asian, Russian, and Brazilian crises as well as continued sluggishness in Europe.

Making Regulations Part of the Solution

Regulations are a crucial factor in influencing investment decisions. Investors in telecom networks are looking to earn returns commensurate with their risk-adjusted cost of capital and consistent with their other investment opportunities. These needs and preferences of shareholders of publicly held companies are transferred to firm managers who are, therefore, sensitive to the risk, return and growth profile of alternative investment plans and programs. And government regulations influence both the incentives and opportunities firms have to invest. In this way, regulations influence the ultimate investment decision.

The major regulatory barriers to investment in new technology for rural areas are the result of federal statutes and regulations that prohibit several large incumbent telephone common carriers from owning facilities and providing services. Related barriers arise for these same companies as a result of rules that raise expected costs or risks, reduce growth opportunities or otherwise reduce the relative attractiveness of investment in rural areas.

A very important regulatory barrier to investment in rural backbone facilities is the provision in the 1996 Telecommunications Act (Section 271) effectively prohibiting RBOCs from providing interLATA data service. This prohibition is an artifact of the 1984 Modified Final Judgment in the AT&T antitrust case and was initially directed at the market for voice services, which then characterized the bulk of user demand.

The LATA boundaries discriminate against rural users. The lower population density in rural areas means that a much greater percentage of calls among households and businesses are between LATAs. Thus, any rule that strips users of interLATA options has a much greater impact on rural users than on urban ones. And, the proscription on interLATA provision of broadband services by an important sector of the industry simply compounds the discrimination.

Added to this problem are the separate subsidiary requirements imposed on these carriers which increase regulatory delay, and the expanding and uncertain interconnection requirements which compound the investment-discouraging features of the basic 271 requirement.

The results of these regulatory disincentives have been evident in the backbone hub deployment pattern across the United States. Analysis of this pattern by the iAdvance Coalition has shown that regulations do indeed matter, and have a powerful chilling effect on investment.

Given the dangerous state of the broadband divide and the potential for a future that is even grimmer for rural areas, how should policymakers attack the challenges facing the broadband market? The best solution is to change the regulatory structure to allow RBOCs to fully compete in these markets.

This solution makes sense for three reasons: 1) the arguments for keeping these companies out of the market no longer apply, 2) the RBOCs are uniquely qualified to enter these markets, vie for customers, and build the critical infrastructure that will help even the playing field for rural areas,

and 3) regulatory relief will allow companies to use their resources most efficiently, creating greater value and competitiveness.

Why have the RBOCs been kept out of the Internet backbone business so far?

The RBOCs are restricted from owning or operating backbone data networks because of restrictions imposed by Judge Greene at AT&T s divestiture in 1983. The consent decree, written before America Online and other companies began exploring the Internet as a mass-market medium, prohibited the RBOCs from entering the long distance voice market. It was correctly rationed that the RBOC monopoly in the local market would give them an unfair advantage in other ancillary markets. Hence, to protect competition, RBOCs were forbidden from providing inter-LATA services. These restrictions continue today under the Telecom Act of 1996. These restrictions, designed to protect long distance voice competition, have been extended to data services.

Opponents of Internet backbone deregulation assert that the RBOCs will be able to use these networks to solicit and offer long distance voice services, in violation of the Telecom Act of 1996. Certainly any network can be designed to carry voice traffic. But this is not sufficient to say that the only policy solution is to forbid competitive entry. Legislative prohibitions, connected with steep financial penalties for violations, can create financial inducements for compliance and allow rural consumers to benefit from competition.

Opponents of lifting the restriction on RBOC interLATA Internet backbone operation contend that the RBOCs could extend their current market position to deter competition in the backbone market. These claims are simply unsupportable by either economic or competition theory. The RBOCs do not occupy a dominant position in any of the relevant markets — the Internet Service Provider (ISP) and the local broadband connectivity market. Not only are they not dominant, the RBOCs are not the market leader in many of these individual markets.

In conclusion, no rigorous antitrust or economic analysis could conclude that they have the market power to influence negatively competition in the Internet backbone market.

Why would the RBOCs invest now?

All current backbone providers face the same economics. Backbone networks cost billions to construct, requiring firms to lay fiber optic cable up to 13,000 miles across national rights of way. Networks require advanced switching and routing equipment and points of presence (POPs) in each of the areas to be served. Thus, all of the current backbone owners and builders have focused construction dollars on major traffic routes, because they provide the return on investment necessary to justify the high construction costs. The backbone networks are designed to minimize costs — minimize the amount of fiber optics required, the amount of equipment put in place, and the amount of labor required to service customers. As a result, these networks run between the major cities.

Smaller cities, with less traffic, provide less revenue than major routes. In addition, the incremental costs of construction are higher. In some cases, more than a hundred miles of fiber need to be laid to serve a single rural community. As a result of the higher costs and lower

potential revenue, the expected cash flow fails to justify the investment. These are the economics of *building a backbone network from scratch.*

However, the RBOCs face different economics than existing carriers — economics that make timely, ubiquitous backbone construction financially acceptable. There are two primary reasons why this is true. First, it costs significantly less for RBOCs to make the incremental investment to extend the backbone network to rural communities. Second, RBOCs have a unique strategic imperative for building these networks in rural communities.

Cost Incentives

The incremental costs of building and operating a backbone network can be lower for RBOCs, because *RBOCs are not building their networks from scratch.*[10] RBOCs have existing fiber in the ground and other crucial facilities that can be used to provide backbone services. RBOCs have the switching centers necessary for the advanced equipment and do not have to construct as many additional facilities. RBOCs also have a trained zteam of maintenance workers and construction experts in many rural areas. While the current facilities are geared towards voice traffic, the incremental cost of upgrading these inefficient facilities is far more economical than building a new network.

Much of the equipment, personnel, technology and other resources required by the provision of backbone services are also required by and provided by RBOCs as a part of existing services to the current customer base. Much of the necessary plant for providing an end-to-end broadband service is already in place and/or will be built to service the existing customer base as the local network is migrated toward a full, digital broadband network. Moreover, for reasons related to the indivisibility of certain kinds of plant it makes good economic sense to make provisions for integrated local and long distance data services as local plant is being modernized. Business planners and capital budgeters realize that the future is for fully integrated service offerings and that planning special purpose network additions based on artificial regulatory distinctions is wasteful.

There are also a variety of sources of the cost and production synergies — economies of scope — available to RBOCs that are not available to other firms. These lead to unique cost savings and higher investment values that accrue to the benefit of RBOCs and make the backbone investment more likely for them than for others.[11] For example, engineering plant and acquiring other

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[10] In fact, because RBOCs have provided service based on LATAs, and States — geographical distinctions that have no meaning to backbone providers striving to construct efficient networks — RBOC networks are different than what a new carrier would ever build. They are, in fact, inefficiently designed.

[11] Cost savings from providing multiple services or products from a single plant rather than building specialized, stand-alone networks for the provision of each service or product are observed economy wide. These savings derive from *economies of scope*, a notion that parallels the better known concept of economies of scale. Firms can become more efficient by increasing the output of one service or by increasing the number of different services produced by a single plant.

Both theory and practice confirm the existence of significant cost savings associated with the provision of multiple services from a single network. Postal Systems offer both first, second and third class mail; power companies provide peak and off peak services; transport firms offer front

resources necessary to provide high quality local calling services will reduce the cost of providing origination and termination services for connecting carriers who provide long distance calls. These cost complementarities are common sources of scope economies in network-based industries.[12]

Moreover, much of the cost of capital for constructing these very capital-intensive broadband facilities is related to uncertainty about demand and/or anticipated volatility of demand and costs. As most investors recognize, RBOCs are in a superior position to manage and offset these uncertainties. RBOCs have close contact with users in these communities and in fact do the billing for both local and long distance services. By providing both local and long distance parts of the end-to-end call, RBOCs will be able to adapt the plant and service offerings quickly and frequently in real time in response to changing market conditions. Control over the cost of both service segments will permit adaptation in the details of evolving customer demands, thereby

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and back haul of variable sized packages; and, of course, telecom companies provide both voice and data services, while some cable companies provide video and voice and data services.

The provision of voice, data, graphics and video over a single digital telecommunications network is likewise subject to economies of scope. An easily understood source is sharing, or common use of, a single facility or input, where the costs of the facility or input is independent of the number of other inputs used or outputs produced. Thus, for example, the cost of providing adequate lighting or heat or disposal to an area is frequently independent of the number of units produced, the number of other resources used or the number of different products produced. A form of spreading the overhead, this form of scope economies has been widely observed in all industries. The most common illustration is peak and off peak service for utilities or direct and backhaul service for transit firms, but such economies exist in telecom networks as well.

A related source of scope economies arises when plant or facilities constructed for one purpose, or one type of output, may be used for another. Networks are almost always sources of these types of scope economies. Networks constructed principally to serve one set of user demands may be available to serve others at very modest incremental costs. Where the incremental cost of serving other needs is less than the costs supplying that need via a separate, stand alone network, economies of scope exist and a multiservice supplier may be the most efficient.

[12] These and other sources and examples of economies of scope are sometimes relied on to argue that certain types of production and firms are natural monopolies. However, the point here is different. While scope economies in the provision of intraLATA and interLATA digital broadband facilities have not been shown to rise to the level required to support an inference of natural monopoly and the need to preserve the market to a single firm, such economies do arise to a level to assure substantial cost savings by incumbents.

Productive efficiencies from incumbent economies of scope will both hold and force rates of all technologies down and result in greatly enhanced consumer welfare. Wall Street financial analysts have recognized the importance of economies of scope in other contexts. Drawing on financial analyses from Wall Street some analysts have predicted the emergence, in the wake of successful consolidation of Bell Atlantic and GTE, of strong incentives to invest in data services, including new internet backbone. Indeed, the combined enterprise will face strong incentives to invest in data services, including new internet backbone, because such services tend to be highly complementary to its core network services.

serving customer needs better while at the same time dampening any potential fluctuations in sales, costs and earnings.[13]

Given the sunk capital and human resources already in place, it would require *more* incremental investment to construct backbone networks on the part of other providers, than to build upon the inefficiently deployed existing human and capital resources. In sum, the incremental investment involved in meeting demand in rural areas is significantly lower than for any other backbone network provider. RBOCs can serve rural Americans with high quality backbone connectivity for less.

Strategic Incentives

RBOCs also have a unique strategic imperative to build high-speed backbone connections in urban and rural areas, alike, because of their local broadband business. While the RBOCs serve business customers, they are also the primary local service providers to the majority of America s households. Their networks reach more households than any other wireline network system, and the RBOCs have plans to offer advanced broadband services to their current customer base. These customers increasingly demand end-to-end broadband connectivity — meaning that if the backbone is slow, the RBOCs can t sell customers local high-speed access service. The RBOCs, the only company offering high-speed local Internet access in many areas, need to ensure high-speed broadband connectivity *end-to-end*, including the backbone. This is an added financial inducement particular to the RBOCs that makes investing in ubiquitous backbone networks a key component of their overall business plan.[14]

Furthermore, the flexibility and versatility of digital networks, combined with growth in demand for digital services, will compel incumbents to hasten their migration to digital, broadband

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[13] It should also be noted that RBOCs have enormous capital resources and access to capital markets. While several firms have the financial size and wherewithal to address the market for broadband telecommunications services by building digital networks, few combine financial resources with current presence in the marketplace and enjoy the confidence of the financial community in their ability to execute a unified broadband telecommunications network strategy.

This is not to say that only incumbent telephone companies have the necessary combination of resources and expertise to build out broadband telecom facilities within and to rural communities. There is also the significant opportunity cost of foregone network evolution development and associated economic development associated with policies denying incumbents the ability to serve those markets and denying users the opportunity to patronize them.

[14] New firms using new technologies and new network configurations have entered and will expand their offerings of broadband digital services supporting a wide variety of voice, video and data applications. Incumbents must respond; or, they will simply be displaced in the market as their existing customers migrate to more diversified rivals. Investing in broadband facilities is a strategic necessity for an incumbent local telephone company. Inasmuch as rival networks now being constructed and likely to be constructed will be multiservice networks, an RBOC decision not to invest in such facilities is equivalent to deciding to exit from that market space.

networks. They have no choice, if they are to be in the telecom business, since both technological and economic forces dictate that the telecom business of tomorrow will be digital.[15]

RBOCs also have the incentive and opportunity, not available to other firms, to add services complementary to their core offering. The companies have done this for years in marketing so-called "vertical services, those that add value to and draw value from their core service offering. Construction of high quality, user responsive, broadband backbone networks and services will stimulate demand for local access and related local broadband services provided by RBOCs. Conversely, RBOC efforts to stimulate demand and revenue from local services will be secondarily rewarded by increases in sales of complementary backbone services. To the extent that RBOCs are allowed to and do capture both, their incentive to invest -- in both types of facilities -- is greater than for specialized firms with whom they compete in either market.

Synergies associated with vertical integration and economies of scope now driving efforts by ATT and MCI to integrate into local distribution and thereby offer integrated end-to-end service are the very same as those rationalizing investment in interLATA links by local carriers.[16] The consensus among experts is that long run equilibrium in this sector will be marked by a number of full service, fully integrated, end-to-end suppliers. The economies are symmetric. As stated by Alchian, "AT&T and MCI clearly comprehend these benefits. Their recent steps toward greater vertical integration testify to the fact that vertical integration is more important now to the efficient production of telecommunications services than it was a dozen years ago.

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[15] The growth of demand for high-speed digital services is dramatically outstripping growth in demand for narrowband, slow speed voice services. Some in fact have suggested that in the not too distant future voice services will be virtually a free byproduct of broadband digital networks and given away by network service providers as part of a larger package including data and video services. Shareholders of incumbent telephone companies impel managers to serve these rapidly growing data markets.

Plant and equipment now in place and used by local telephone companies has been accumulated over several years as the result of investment decisions driven largely by the requirements of residential and small business, voice communications and to a lesser extent by large user demands for broadband, digital links. Existing plant is being replaced, where possible, and complemented where necessary by network facilities required to service the growing and diversifying demands for digital communications by households and businesses alike. Most of the plant now in place was constructed well before the Internet explosion and was optimized for meeting a much different set of communications requirements from those now emerging with the proliferation of networked computers and digital applications. The old, analog, voice network cannot simply be scrapped and replaced overnight. A variety of technical, economic and regulatory factors condition the process of migrating old public switched voice, to hybrid networks, to new all-digital networks of the future.

[16] As a practical matter local and long distance service are not inherently separate (as is made abundantly clear in the case of satellite services, for example). They are closely related by both consumer use and production by firms, inasmuch as both are marked by considerable jointness of the two distance characteristics. The distinctions between local and long distance are not technologically or economically based, rather they are artifacts of decades of distinctions defined and refined in and by regulatory processes. As is becoming increasingly clear from the behavior of other firms trying to integrate local and long distance, there are very substantial revenue synergies from incumbent investment in broadband that are available for capture by other firms.

Correspondingly, the costs of precluding vertical integration by the RBOCs are greater than at the time of divestiture. [17]

Therefore, the RBOCs will have strong strategic incentives to invest in high-speed backbone connections in urban and rural areas to compete in the emerging marketplace. These incentives, combined with their cost advantages over other carriers in building such networks, will provide a powerful inducement for the RBOCs to deploy needed infrastructure.

Efficiency Benefits

One final justification for regulatory relief arises from the way in which the telecommunications network is used. The existing public, switched telephone network has been designed for the requirements of circuit switching and voice calling. It has been optimized for unique requirements of voice communications: frequent, but irregular, calling, short holding times, narrow bandwidth requirements, high tolerance for minor errors, and the like.

However, computer-to-computer communications -- indeed all data communications irrespective of which terminal devices are used (computer, fax, digitized voice, advanced television devices) or which format is used (voice, video or data) -- require *a much different network design and different protocols*.

Therefore, from the point of view of network design, it is inefficient and wasteful to design partial networks defined for non-economic, non-technical, purely regulatory restrictions. Yet, this is the case today, and will remain the case as long as interLATA restrictions remain in place. To deal with this regulatory obstacle, network designers must either ignore the prospect of eventual integration of voice and data, local and long distance, or engineer into the network features that will permit eventual migration to a fully integrated system. Either way, the existence of regulatory prohibitions on service provision will engender substantial, and otherwise unnecessary, wasteful resource use.

If these prohibitions were removed, networks could be designed to take advantage of new technological realities in a seamless way. Network design and deployment would be more efficient, and therefore, cheaper. Companies would benefit by becoming more competitive, and consumers would benefit both from this competition and from improved service.

Policy Solution Summary

The carriers with the greatest financial ability and incentive to build networks in rural areas are the only operators prohibited from doing so. This restriction, applied at a time before the Internet was commercialized, served no obvious or overriding policy interest. In fact, the lack of ubiquitous, timely, end-to-end broadband networks connecting rural America with the rest of the country has created a strong public policy interest in removing this outdated regulation.

Congress should pass legislation ending the interLATA restriction for data networks servicing Internet and data traffic. There remains a strong policy interest in protecting the long-distance voice market from anticompetitive practices. To protect the voice market, Congress need only limit the transmission of voice-only services over these networks. Legislation should also

[17] (Alchian, at 9)

prohibit any RBOC from marketing voice-only long distance services and impose stiff penalties for straying from these legislative provisions.

However, given these provisos, the underlying need is for regulatory reform. It is the best way to give rural America the infrastructure it needs and to keep the broadband market vibrant and competitive.

Why Regulatory Reform Holds Up

While there are many significant benefits ascribed to the potential regulatory reform discussed above, it is also fair to address some potential criticisms of this plan. Some have posited that the current regulatory structure continues to serve a purpose. Others, most notably the Competitive Broadband Coalition (CBC), have argued that RBOC investment is either unneeded, or unlikely in the event of a regulatory change.

However, when these issues are examined more closely, it is clear that the concerns are unwarranted. There is no good reason to keep the current regulations, and ample reason to support the notions that new investment is needed and that RBOCs will do it.

There is No Good Reason to Keep the Current Regulations

Whatever sense LATA boundaries have made in the world of analog voice technological design will be lost in the digital world now evolving. Narrowband copper cable and hierarchical switch architecture represented the only feasible design for a major telephone system until almost 1990. However, with fiber optics, two-way coaxial cable, and fast microelectronics with digitalization and signal compression, horizontal network design is possible with individual controllers at each customer's location, directing calls on a common broadband buss and linking customers across relatively large geographic areas. Each customer becomes the only unique element.[18]

Most of the assumptions on which the InterLATA restriction was based are not relevant now

These assumptions were:

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[18] Alchian at 8-9. He goes on to note that in the absence of regulation, this kind of technological change would alter the degree of vertical integration in the industry. Without any clear long distance "gateways" -- central points equivalent to class 3 switches-- long distance and local service facilities would become integrated throughout the system. With no "toll" lines, and no "toll" switches, long distance would become a service transported throughout the network with every function potentially involved in every call. There would be no clear break point between interexchange and local exchange facilities and service. The point for logical vertical disintegration would disappear. Every line, switch and employee would be producing part of a seamless single telephone facility, and divided responsibility for separated functions would becomes contractually and technologically infeasible...In such a system, local and long distance communication would no longer require different equipment. Any switch could potentially be connected to any other regardless of their "level"... Indeed, the distinction between local and long distance service would no longer need to be manifested in special facilities -- the distinction would be more in the customer's mind than in the facilities they would be using.

1. **The local exchange is a natural monopoly.** The local exchange is not now a natural monopoly. At the time of imposition of the restrictions, there had been no clear market test of the natural monopoly thesis, while econometric studies were contradictory, incomplete and inconclusive. Market events, particularly the entry and growth of numerous local rivals, has established that there is no natural monopoly to be leveraged into long distance market dominance.

2. **The RBOCs are protected by significant institutional barriers to entry.** Open entry and competition promotion policies have resulted in substantial development of competition for local exchange services in recent years. The fact of the existence of a competitive local exchange industry that now captures a significant portion of the high margin local exchange traffic and growing amounts of small and medium business traffic is testament to the fallacy of the entry barrier assumption.

3. **The RBOCs can leverage the local exchange monopoly into other markets.** With no monopoly to leverage and no protected revenue pools, the ability of the CLECs to leverage existing businesses is determined solely by efficiency considerations related to production -- in particular scale and scope economies.

4. **The RBOCs can employ cross subsidization for monopoly services to underwrite entry and suppress competition in other markets.** The threat of systematic and substantial cross subsidy, in fact if not in theory, has been eliminated by a) open entry and competition in the high margin business which reduces the revenue pools from which subsidies can be drawn and b) regulators have developed -- in the context of enforcing the interconnection requirements of the 1996 Act -- more and more sophisticated tools to prevent cross subsidy and to assure nondiscriminatory access to any potential bottleneck local facilities.[19]

In short:

> The development of broadband networks has significant policy ramifications. The migration of power out of the switch, together with the proliferation of alternative networks -- wireless, cable and [CLECs] -- has already made local telephone carriers extremely vulnerable to competition and will in the future eliminate any vestige of bottleneck control in the local exchange. Local telephone service is no longer the natural monopoly it was assumed to be, if indeed it ever was. The...line of business restrictions, which were based on the premise of a local telephone monopoly, therefore fail to serve a purpose at this point. More importantly, they prevent some of the industry's strongest companies from fully participating in the development of new broadband networks and related technologies. The successful development of these networks, which will benefit both consumers and the U.S. economy more generally, requires huge amounts of capital, as well as operating expertise that the BOCs are uniquely positioned to provide. [20]

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[19] A more extensive discussion and refutation of these assumptions has been made elsewhere. See Affidavit of Pablo Spiller.

[20] George Gilder at 10.

RBOCs Cannot Impede Competition in InterLATA markets

It is incongruous to prohibit entry into markets with limited competition and insufficient capacity on grounds that entry would hurt competition. New entry by RBOCs into the interLATA market for broadband services will increase both capacity and rivalry in the marketplace. These changes are assured to benefit consumers by providing more choice, lower prices, higher quality of service and more responsiveness to disparate and dynamic consumer needs. It is particularly incongruous to deny consumers choices in interLATA broadband markets on grounds that they have too few choices in the intraLATA market. The notion that RBOC entry into interLATA broadband markets will in any way "impede" competition or reduce market rivalry or eliminate competitors is simply not supportable by fact, theory or experience. It is an argument put forth by special interests that are using regulatory and political processes to protect established market positions. Gaming in the regulatory process should not be an acceptable substitute for excellence in the marketplace.

Continuation of the interLATA restriction will contribute to the development of market power in the end-to-end broadband marketplace

The structure of the supply side of the market for end to end broadband services has not yet been determined. It is evolving as several firms develop necessary piece parts that will in the future be joined (specialized CLECs and IXCs), while other firms, most notably AT&T and WorldCom/MCI are actively engaged in putting together the pieces enabling provision of end to end broadband services. The demand side of the market for such services is still not well defined and will continue to evolve in synch with developments in market supply. There are very likely substantial "first mover" advantages -- advantages that confer market power on firms first to market -- that will be difficult to overcome subsequently by other firms that are handicapped in the early stages of the development of both the market and the technology. Thus, public policies that consciously and purposively handicap one class of potential supplier while encouraging others will in fact tend to lessen competition and create market power in an important line of commerce -- in direct contradiction to the direction and force of U.S. competition policy for nearly a century.

The interLATA restriction will also tend to lessen competition in the local market for video services

A major concern of public policy over the last decade or so has been to devise the means for reducing or channeling the market power of local cable television operators. The clear direction of both technological and market forces is to bring together into a single network both local and long distance services in digital formats of voice, video and data. Given the synergies between local and long distance service integration, any restriction on the ability to exploit economies of scope in the local/long distance space, will also hamper the development by RBOCs of full service local networks that can compete with the cable television monopolies that serve most US households. The core of AT&T's argument that it needs revenue from information services to buttress the business case for upgrading cable networks to provide voice service is symmetrical and applicable for RBOCs as well. Cost and demand synergies from the provision of integrated local and long distance will create value that can support and encourage the development of consumer choices from alternative local video services.

> "The Regional Bell Operating Companies would be potent competitors in the interLATA market. In particular, their incremental costs would be lower that a *de novo* entrant's because they can serve much of the market by increasing the capacity of their existing facilities rather than building entirely new facilities."[21]

Furthermore:

> RBOC entry would increase the number of substantial facilities-based interexchange carriers and increase capacity serving the market...RBOC competitive pressure would force down prices for smaller customers, increase service quality and stimulate new services...These improvements would stimulate growth in demand for interLATA services...which would add more value than it would add costs.[22]

There was never a very good reason in the first place

The public interest benefits of the arbitrary separation of intraLATA from interLATA markets and foreclosure from the latter for incumbent local telephone companies are indeed elusive. Such benefits were not carefully evaluated at the time they were imposed and have not been estimated since. It is simply assumed, without analysis or measurement, that the public s interest was best served by denying consumers the ability to choose from all carriers willing and able to provide them service.

> The decree implicitly made a wager that the regulatory distortions of those portions of the economy, which could have been workably competitive, yielded social losses in excess of the magnitude of economies of scope that would be sacrificed by this approach. It was a wager, a guess. It would be absurd to pretend it was made on the basis of detailed econometric data. It was not; we did not have the data...It was a judgment call, and I guess, in some senses I do not yet know. Maybe we will never know whether it was right or wrong.

This is indeed a remarkable admission by the senior government official involved in drafting the restrictions on interLATA market entry that continue to deny consumers choice in of voice services and if left unchanged will deny them choice in the digital world as well. No matter how you read it, and stripped of all pretension, the Assistant Attorney General for Antitrust did and does not know if the interLATA proscriptions created more benefits than costs for the public. Nor, have defenders of the interLATA restrictions put forth any evidence in the interim.

In sum then, there is no reason to keep the current regulations based on their original purpose, their current effect, or their future ramifications.

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[21] Affidavit of Richard L. Schmalansee at 2.

[22] Schmalansee at 2.

Why the Objections to Reform are Misplaced

Several papers, written for and by current broadband service providers, have been released claiming that RBOC entry into their markets is unnecessary, anti-competitive, and otherwise counter to the public interest. Their assertions range from the sublime (e.g., RBOCs make too much money) to the poignant (e.g., RBOCs cannot be trusted). In fact, a careful review of the evidence presented, history, and basic financial and economic analysis reveals a dearth of compelling commentary on the merits of not opening the market for data, broadband services to competition.

A review of their assertions (especially those of the CBC) follows, accompanied by the clear reason why their concerns are misguided.

Claim 1: RBOC investment has been weak in the past and will be weak in the future

The historical composition and growth of RBOC investment is fully consistent with the technological, economic and regulatory constraints that these companies have faced. There is no reasoned economic basis for faulting their investment pattern.

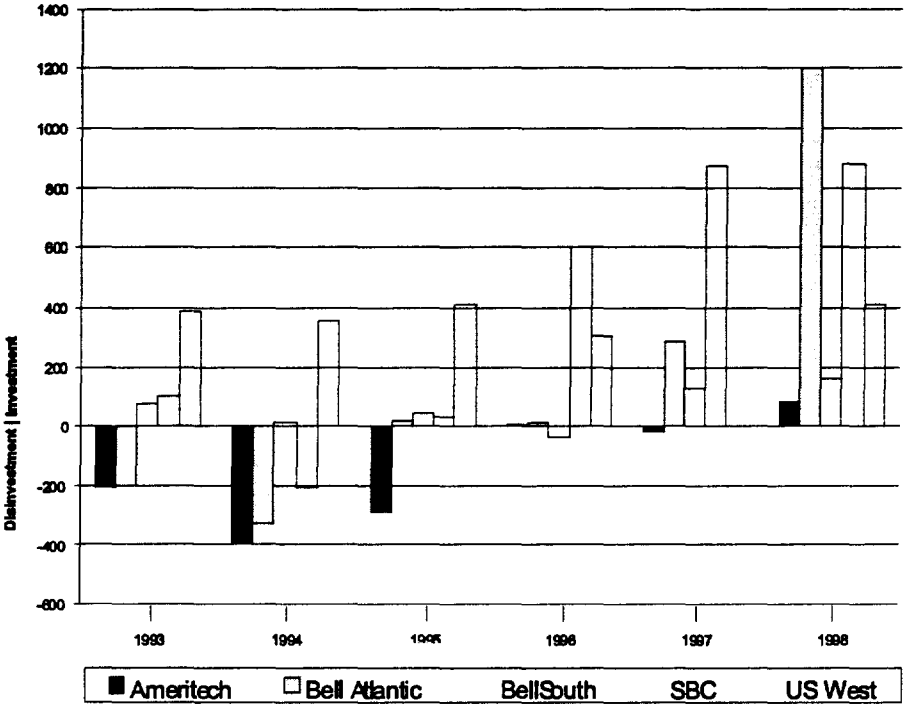
The dip in RBOC investment in the mid-nineties was largely a monetary phenomenon. In real terms, the companies were replacing more expensive, but lower capacity, equipment with cheaper, more functional plant. This is very similar to what has happened on millions of desktops in the past decade: computer users were spending less on hardware, but getting more capacity. More bang for the buck means fewer bucks, but not disinvestment.[23]

Furthermore, in the past few years, overall RBOC investment has been rising significantly; as depicted by the Competitive Broadband Coalition s own graph.[24]

[23] It should also be noted that regulatory constraints on RBOC investment continue to prevent them from cream skimming on the high-margin user — something that all new entrants continue to do. Supplier-of-last-resort regulations oblige the incumbents to be sensitive to the needs of all users, not just those that provide the greatest profit.

[24] Part of this increase is attributable to system redesign for network unbundling, operating support systems and other competitive-entry related items. Other major investments include local broadband distribution systems, loop conditioning, and digitalization.

Reproduction of Figure 2.3, Economics and Technology, Inc., Building a Broadband America, The Competitive Broadband Coalition, May 1999.



Despite this strong investment performance of late, rigorous and detailed regulatory oversight has continued to play an important role in shaping RBOC investment patterns. Until October 1990, rate-of-return regulation directly (albeit implicitly) discouraged investment.[25] As the chart shows, upon its removal, RBOC investment began to rise.[26] But even in the period since, significant regulatory barriers, such as Sections 251-254 and Section 271 of the Telecommunications Act of

[25] In a FCC s Memorandum Opinion and Order, released on May 30, 1997, price cap regulation provides carriers with incentives to operate more efficiently by reducing costs so that these carriers can realize greater earning potential. *See* Policy and Rules Concerning Rates for Dominant Carriers, Second Report and Order, CC Docket No. 87-313, 5 FCC Rcd 6786, 6818-20 (1990) (LEC Price Cap Order).

As of October 4, 1990, the Commission required price cap regulation for the BOCs and GTE, and permitted other LECs to adopt price cap regulation voluntarily, provided that all their affiliates also convert to price cap regulation and that they withdraw from the NECA pools. As recently as three years ago, the price cap LECs served more than 92% of the total access lines.

[26] The Competitive Broadband Coalition has criticized the fact that this investment was not focused on the Internet at this time. . However, it takes little effort to imagine the response of regulators if RBOCs had dedicated vast sums to serve the digital revolution in the early and mid-nineties, well before the explosion of the Internet and related digital services. Indeed, RBOC investment in ISDN was scorned by regulators, bankers and others alike with the comment that ISDN stood for, Investments Subscribers Don t Need.

1996, have restrained investment. Although these provisions serve an important pro-competitive role in the voice market, they have little applicability in the data market. These rules, many of which AT&T Chairman C. Michael Armstrong claims to be so onerous that his company would not be able to justify cable broadband investment, have an enormous chilling effect on investment in broadband telephony.[27] In other words, while RBOC investment is robust, it would be even greater if they did not shoulder a weighty regulatory burden.

On a related front, RBOC opponents assert that the RBOCs only deploy local broadband services in the face of pressure from competing wireless, satellite, cable, and telephony providers. It is certainly true that the RBOCs have not rolled out broadband services as aggressively as other, non-regulated service offerings. Given the current set of regulations that raise the risk and uncertainty of returns on investment, it makes sense for the RBOCs to invest cautiously. Given basic economics, it should not be surprising that all companies are investing in the same locales.

Even members of the FCC have acknowledged that many rules impose perverse investment incentives.[28] Commissioner Michael Powell recently described part of the problem:

> I believe we [the FCC] have an unfortunate tendency to adopt regulations where the objectives are dependent upon a company or an industry acting against its own self-interest! Think about the section 271 application process for RBOC entry into the long distance. In order to gain authority to enter the long distance market, RBOCs are required to help would-be competitors in the local market steal away the RBOCs' own customers. It s like asking the Redskins to help the Cowboys win a football game.[29]

The claim that the RBOCs will not make investments in areas where the market and regulations allow it to be profitable is not only counterintuitive, but also unsupported by history.

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[27] *See* AT&T statement: "Congress understood that cable companies today offer the best hope of providing competitive local exchange services to a broad number of residential customers, but doing so will require cable providers to invest billions of dollars to upgrade their network... an economic and technological risk that cable companies will not undertake if they would then have to provide unbundled access to those upgraded facilities." From MacMillan, Robert AT&T — Internet Unbundling Would Hurt TCI Merger. November 16, 1998. <http://www.cnnfn.com/digitaljam/newsbytes/121513.html> June 14, 1999.
Also, see statements attributed to C. Michael Armstrong, CEO of AT&T, from Breznick, Alan. AT&T Strikes Back at AOL. CableWorld , November 9, 1998. <http://www.cableworld.com/articles/News98/1998110907.htm > June 10, 1999:
Rejecting this argument, Armstrong accused his company's critics of wanting the government to give them a free ride on those broadband pipes. After AT&T, TCI, other MSOs and @Home spent billions of dollars building a new broadband infrastructure, he said it would be not fair and not right for the government to let others use it for little or no cost. If those companies want to move up into broadband, terrific, he said. But getting a free ride on someone's investment and risk is not the way to do it.

[28] See, e.g., Dissenting Statement of Commissioner Harold Furchtgott-Roth Re: Prescribing the Authorized Rate of Return for Interstate Services for Local Exchange Carriers and Policy and Rules Concerning Rates for Dominant Carriers, CC Docket 98-166.

[29] Speech by Commissioner Michael K. Powell before the America's Carriers Telecommunications Association, December 15, 1997.

Claim 2: RBOCs have no interest in serving rural areas, as witnessed by their recent divestitures of rural exchanges

RBOCs have been divesting rural exchanges. The Competitive Broadband Coalition suggests that this indicate a lack of interest among RBOCs to serve these communities, and a growing interest among CLECs to serve these areas.[30] The Competitive Broadband Coalition also suggests that more aggressive rollout by independent local exchange carriers (LECs) is a clear sign that such investment is possible without significant regulatory change.

This analysis ignores basic economic and regulatory factors that make these transactions a win-win-win for RBOCs, independent carriers, and consumers. *The simple fact is that the properties are worth more to the acquiring companies than to companies like US West, because of the difference in regulatory treatment, not because of inherent differences in managerial ability or strategic direction.*

Small, independent local exchanges have been on a buying spree to increase the size of their service areas, in an attempt to capture economies of scale and scope. Most purchases of RBOC exchanges are by independent carriers looking to buy contiguous exchanges — assets that help the acquirer to achieve economies on both the cost and demand side.[31] Hence, the value of these rural exchanges is often higher for smaller companies than it is to a large RBOC such as US West.[32]

Even more fundamental to these decisions are the regulatory incentives for RBOCs to divest rural exchanges. The exchanges served by independent carriers are eligible for payments from the current universal service system that RBOC-owned exchanges cannot capture.[33] This

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[30] Selwyn, Lee L., et.al. Building a Broadband America: The Competitive Keys to the Future of the Internet, Economics and Technology, Inc., May 1999.

[31] According to numerous business analyses, small, rural exchanges can capture greater economies of scope and scale than larger companies with a mix of urban and rural exchanges. *See, e.g.,* Gabel, David and Kennet, D. Mark, Economies of Scope in the Local Telephone Exchange Market, Journal of Regulatory Economics, 6 (1994): 381-398.

[32] *See, e.g.,* F. Gasmi, J.J. Laffont Idei and W.W. Sharkey, Incentive Regulation and the Cost Structure of the Local Telephone Exchange Network, Journal of Regulatory Economics, 12 (1997): 5-25. *See also, e.g.,* Rajiv D. Banker, His-Hui Chang, and Sumit K. Majumdar, Economics of Scope in the U.S. Telecommunications Industry, Information Economics and Policy, 10 (1998): 253-272.

[33] *See* Recommended Decision of the Joint Federal-State Board on Universal Service, CC Docket No. 96-45, released November 8, 1996. The rules for apportioning universal service funds, which will remain active until July 1999, have included certain provisos which give advantages to small, rural carriers:

For LECs with above-average loop costs, the existing high cost assistance fund shifts a larger percentage of the loop costs to the interstate jurisdiction and permits those LECs to recover this incremental allocation from the high cost assistance fund.

LECs with study areas of 200,000 or fewer loops receive a greater percentage of their above-average loop costs [and also] receive an additional interstate allocation of 65 percent of the unseparated cost per loop between 115 percent and 150 percent of the national average cost per loop, multiplied by the number of working loops. That additional allocation, coupled with the 25 percent allocation for all carriers, means that carriers with loop costs greater than 150 percent of

government-sponsored financial inducement creates compelling reasons for transactions between RBOCs and non-RBOCs.

Perhaps even more compelling is that many regulatory mandates do not transfer with the sale. An RBOC exchange is subject to unbundling, pricing, and resale provisions under the Telecom Act of 1996. Additionally, RBOCs are prohibited from operating backbone networks and selling these services. In a sale of an RBOC exchange to a non-RBOC, none of these obligations transfer to the acquiring company — allowing them to offer broadband services without the risk of resale or price controls. The regulatory freedom makes it much more attractive for independent companies to build advanced services — and the evidence presented by both the Internet Advancement Coalition and the Competitive Broadband Coalition support this! When carriers are not under these restrictions, they invest more in rural facilities, both local distribution and backbone hubs.

The selling of rural exchanges is driven by the current regulatory regime and market economics. Without these burdensome regulations, RBOCs would not have the incentive to sell but to build — just as independent carriers are deploying DSL services in the absence of these regulations.

Claim 3: There is no bandwidth crunch.

Opponents of reasonable regulatory relief contend that there is no bandwidth crunch. In fact, some suggest that the reverse is true, that there is a bandwidth glut. [34] They continue by arguing that the current limited set of competitors is sufficient to guarantee a robust market with ample bandwidth. While this may or may not be true, it begs a more fundamental question about how government regulates markets. Should it be the government s place to determine the sufficient or appropriate number of competitors in a market? Is it the government or the free

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the national average receive a 100 percent allocation to the interstate jurisdiction for the costs above 150 percent of the national average. In other words, they receive a dollar from the interstate jurisdiction for each dollar of loop costs above 150 percent of the national average loop cost.

[34] Much of the hype about excess capacity in the backbone is based on casual accounting of the number of fiber strands being buried. But, to state the obvious and frequently ignored, putting fiber into the ground is only the first step toward providing backbone services to users. One analyst estimates that it costs $3.5 billion to equip fully (that is to lighten) a single 10,000 mile strand.

Further to the same point, IXC will have spent over a billion dollars by the end of this year to do two things: a) to bury 24-48 dark fibers along a 15,000 mile route by the end of the year, while b) lighting 2-4 of them. Lighting the remainder of these fibers would cost a full order of magnitude more and would require and additional $10 billion in sunk costs. Qwest has estimated that it would cost over $13 billion to light its dark fiber. Williams Company plans to spend almost $5 billion to add 22,000 route miles with 96 or 144 strands, but will light only two strands of the 24 it plans to keep for itself. Lighting the dark fiber will cost Williams nearly $1.5 billion per strand.

Additionally, the fiber glut seems to have escaped Wall Street analysts and institutional investors. Broadband backbone network builders remain some of the hottest stocks in the market, despite the claims that their networks will be chasing inadequate demand. Frontier, Qwest, Williams, and Level 3 Communications shareholders have seen the value of their investment in this buyers market rise 71.1%, 109%, 55.1%, and 60.3%, respectively, *this year alone* (as of June 13, 1999).

market that is in a better position to determine the number of companies or the types of technologies that should be allowed to serve consumers?

Neither Congress nor the FCC should assume the *de facto* role of economic planner by basing economic policy on its and others opinions on what constitutes sufficient broadband backbone capacity. A fully-open market is the only mechanism that can determine how much capacity is enough, and advocates who claim that we should restrict supply based on prognostications of market demand are urging Congress to take on the role of economic planners for the nation.

Markets work. If there is too much capacity evolving from unrestricted entry, then shareholders bear the cost and consumers enjoy the benefits of intense rate competition that follows. However, if Congress guesses wrong and there is insufficient capacity in the future, consumers must pay higher prices and suffer shortages, while the favored suppliers garner huge artificial, policy-generated scarcity rents. The downsides to this scenario for consumers, and the economy as a whole, are staggering.

Claim 4: Rural deployment of advanced broadband services is proceeding in a timely and reasonable manner. There is no digital divide and no chance of one in the future.

Those who contend that there is no danger of a digital divide need to look at the country as a whole — not a handful of anecdotes. It is no more insightful to cite a sprinkling of rural success stories to describe what is occurring in the Internet backbone market, than it is to describe the Brazilian rainforest by examining a handful of leaves.

Fact: Across America, over 90 percent of all backbone hubs (944 of 1042) serve metropolitan areas.[35] Less than 10 percent (only 98 backbone hubs) serve the 51 million Americans living in non-metropolitan areas. This forces local, rural communities to purchase expensive private lines to reach hubs. These lines can cost tens of thousands per month and limit the ability of communities to take full advantage of the Internet.

Fact: Of the six hundred thousand residential broadband Internet users, evidence suggests that no more than thirty thousand live outside of metropolitan areas.[36] While non-metropolitan residences constitute one-fifth of the country s population, they command less than 4 percent of the broadband access lines. The evidence of future buildout in rural areas cited by the Competitive Broadband Coalition does little to allay fears of a digital divide.

Some broadband systems are being deployed. But the evidence to date suggests that we should not be emboldened by current anecdotes or apathetic to the current and continuing digital divide.

Claim 5: regulatory changes would harm voice and broadband competition by allowing the Bells to extend their control over local voice service to other markets

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[35] Boardwatch, Spring 1999. Metropolitan area includes metropolitan statistical areas (MSA), consolidated metropolitan statistical areas (CMSA), and primary metropolitan statistical areas (PMSA).

[36] Data point on rural broadband subscribers extracted from SEC 10-Q reports, industry news articles, and company announcements.

Opponents of data relief argue that removing interLATA restrictions for data and rescinding local unbundling requirements for data, upon completion of substantial buildout commitments, creates competitive problems in the voice market. Firms who do not wish to face additional competitors in the backbone or local market suggest that RBOC entry into data services would create a powerful chilling effect on voice competition.[37]

Proposed legislation specifically and unequivocally forbids any RBOC involvement in the voice market. For a reason that remains unexplained and unsupported, Congressional prohibitions — and incentive based legislation — do not seem enough to satisfy these critics and to justify the reasonable steps necessary to allow RBOCs to compete in the market.

Competition for broadband services will only be enhanced by RBOC entry into this field — it will not be diminished. As numerous Wall Street analysts report, a wide variety of technologies and carriers — cable, satellites, wireless and telephone-based — are rushing into the market space and competing against one another. In an environment where many technologies offer substitutable services, the RBOCs would represent a healthy alternative. Furthermore, proposed regulations would permit CLECs to continue using RBOC facilities as a means of jumpstarting their own business plans.

[37] See e.g., MCI/Worldcom. Why Competition Offers The Only Sure Way To Bring Broadband Services To All Americans, May 1999.

Conclusion

The proposed regulatory relief, which protects competition and encourages investment in a critical infrastructure, allows markets — not regulators or a handful of vested interests — to determine the development of the broadband data market. It also recognizes that rural community economic growth and expansion relies on the broadband networks that are not being deployed.

Proposed legislation does not fly in the face of the 1996 Telecom Act — it supports and extends its basic premise. The Act is intended to provide incentives (such as voice interLATA relief) for the RBOCs to behave in ways that do not impede entry into the voice market. Proposed legislation extends this framework by providing the incentive to make significant capital investments in data networks in a wide range of communities while supporting the Act s fundamental commitment to competition.